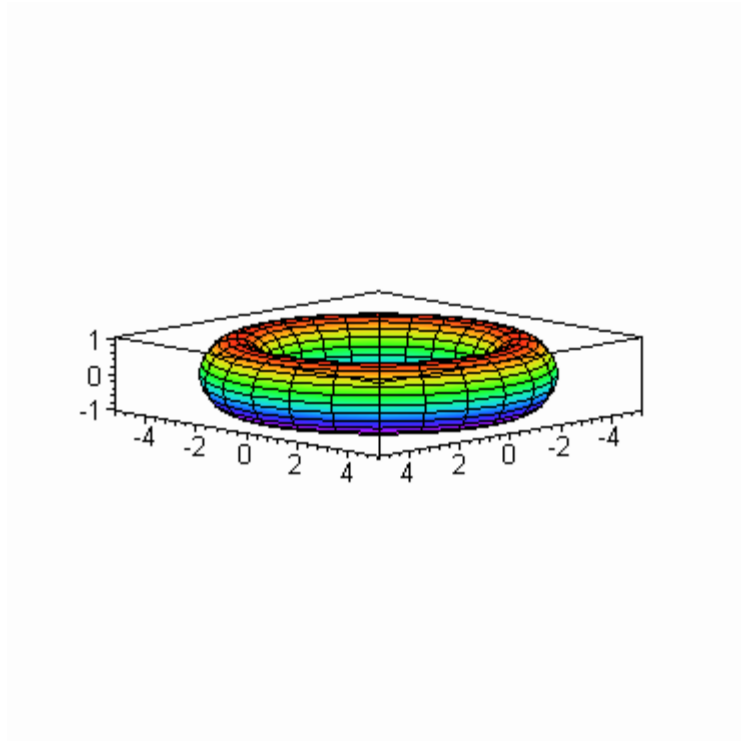# Curvas e superfícies

Execute esta worksheet e faça os exemplos

> **with(plots):**

> **setoptions3d(style=patch,axes=boxed,scaling=constrained,**
shading=ZHUE,orientation=[45,80]):

> **R:=4;**
r:=1;
F:=(theta,phi)->[(R-r*cos(phi))*cos(theta),
(R-r*cos(phi))*sin(theta),
0+r*sin(phi)];
p1:=plot3d(F(theta,phi),theta=0..2*Pi,phi=0..2*Pi):
p1;

$$R := 4$$
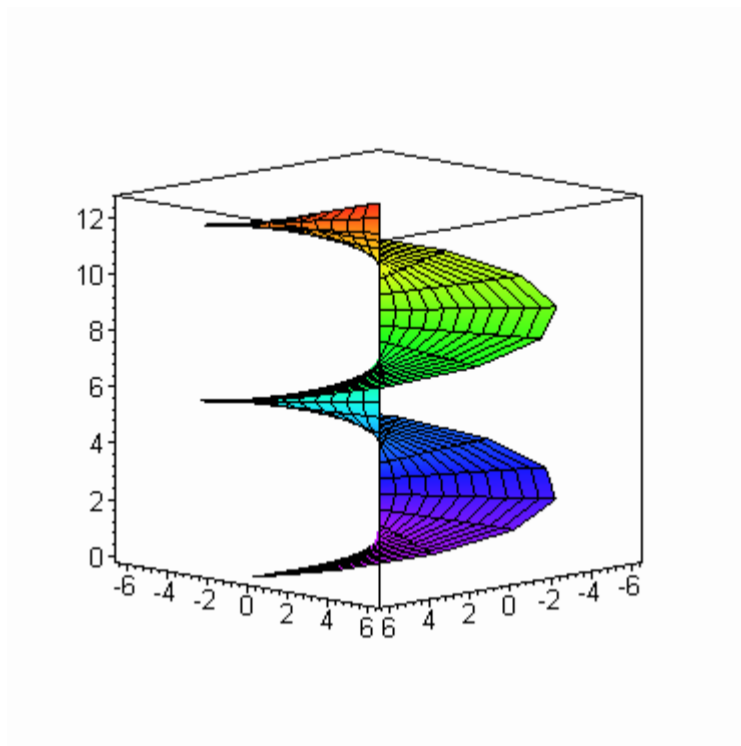
$$r := 1$$

$$F := (\theta, \phi) \rightarrow [(R - r\cos(\phi))\cos(\theta), (R - r\cos(\phi))\sin(\theta), r\sin(\phi)]$$

> **G:=(theta,phi)->[phi*cos(theta),phi*sin(theta),theta];**
> **p2:=plot3d(G(theta,phi),theta=0..4*Pi,phi=0..2*Pi,grid=[24,12]):**
> **p2;**

$$G := (\theta, \phi) \rightarrow [\phi \cos(\theta), \phi \sin(\theta), \theta]$$
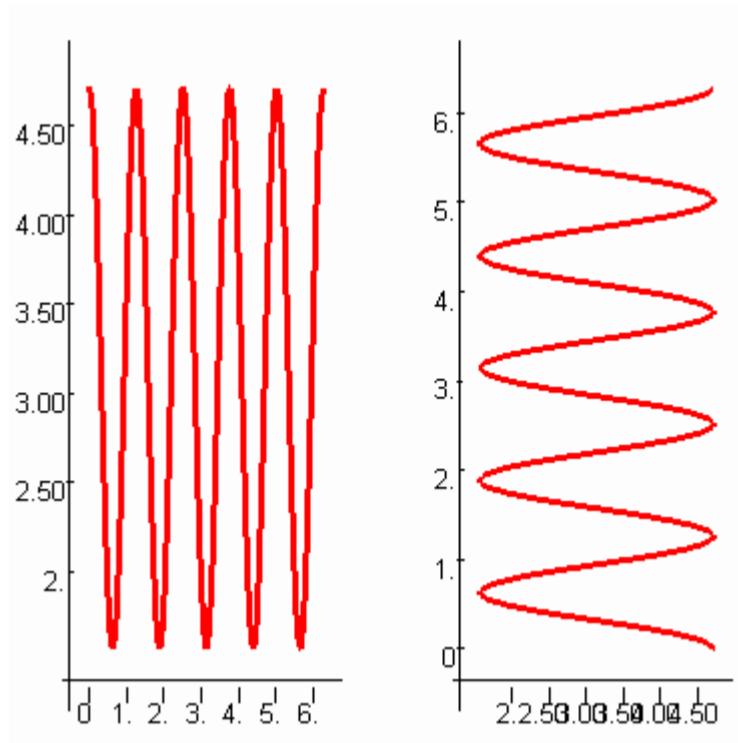
```
>  h:=t->Pi+Pi/2*cos(5*t);
display(array([
plot([t,h(t),t=0..2*Pi],thickness=3,view=[0..2*Pi,0..2*Pi]),
plot([h(t),t,t=0..2*Pi],thickness=3,view=[0..2*Pi,0..2*Pi])]));
```
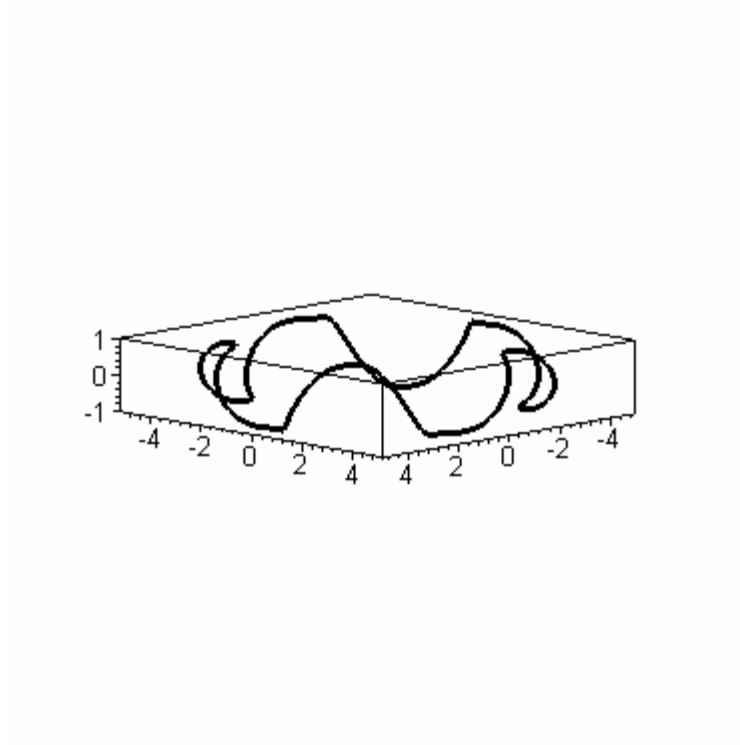
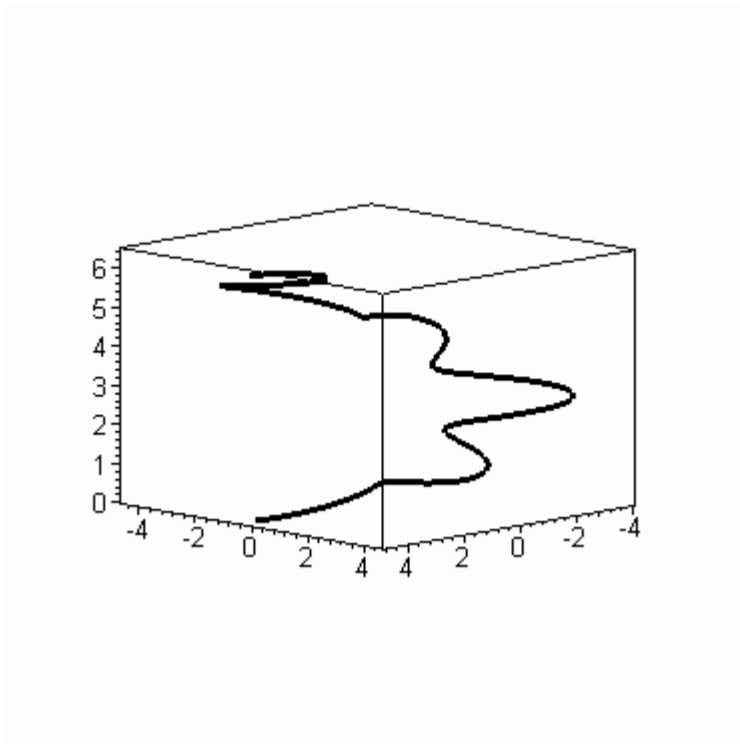$$h := t \rightarrow \pi + \frac{1}{2}\pi \cos(5\,t)$$


```
>  s1:=spacecurve(F(t,h(t)),t=0..2*Pi,
color=black,thickness=3,numpoints=400):
s1;
```
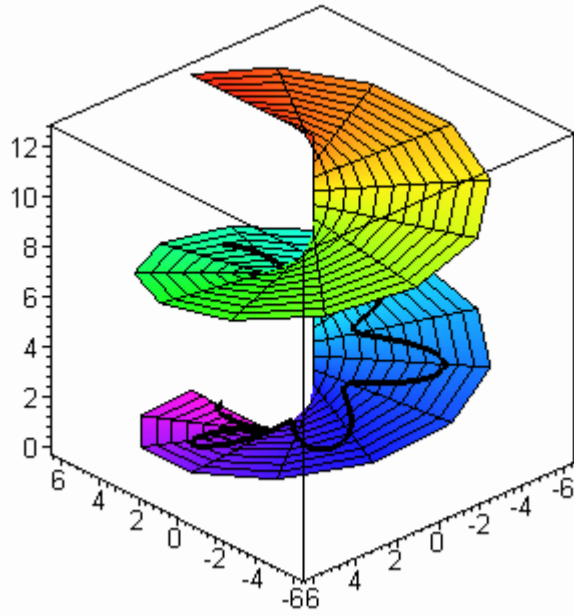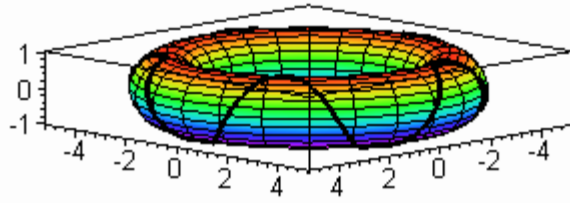
> **s2:=spacecurve(G(t,h(t))+[0,0,0.1],t=0..2*Pi,
color=black,thickness=3,numpoints=400):**

> **s2;**

> **display([p1,s1]);
display([p2,s2]);**

>

>

>

>